A. Title:

Application for a Permit for Scientific Purposes Under the Endangered Species Act of 1973, Section 10(a)(1)(A).

Project Name: Collection of Fish for the Portland Harbor Remedial Investigation & Feasibility Study, Round 3- Data Gaps, Superfund Project.

B. Species:

This application seeks permission to take the following Evolutionarily Significant Units (ESUs) and Distinct Population Segments (DPSs) of threatened anadromous salmonids:

- Upper Willamette River Steelhead (*Oncorhynchus mykiss*)
- Lower Columbia River Steelhead (*Oncorhynchus mykiss*)
- Upper Willamette River Chinook Salmon (*Oncorhynchus tshawytscha*)
- Lower Columbia River Chinook Salmon (*Oncorhynchus tshawytscha*)
- Lower Columbia River Coho Salmon (*Oncorhynchus kisutch*)

C. Date of Permit Application:

July 3, 2007

D. Applicant Identity:

James McKenna, on behalf of
The Lower Willamette Group
Port of Portland
121 NW Everett
Portland, Oregon 97209
Telephone: 503-944-7325
FAX: 503-944-7353
e-mail: Jim.McKenna@PortofPortland.com

E. Information on Personnel, Cooperators and Sponsors:

1.0 Principal Investigator

Dr. Robert H. Ellis will be the principal fisheries scientist in charge of the fish sampling program including all field activities (See Appendix A for resume'). Dr. Ellis has served as principal investigator on several previous studies, which required a Section 10 Taking Permit. Those studies included collection of juvenile salmonids and other fish from shallow water habitats in the Portland/Vancouver reach of the Columbia River (Permit #1131) for the Port of Portland, research on the use of an air bubble screen to reduce or minimize

juvenile salmonid mortality on a floating dry dock (Permit #1326) for Cascade General, Inc., and research on the residence time and distribution of juvenile salmonids in the lower Willamette River (Permit #1328) for the Lower Willamette Group (LWG). Boat electrofishing was a primary technique used to collect fish in all three of the previous studies.

2.0 Field Personnel

The following persons are likely to be involved in the proposed fish collection activities:

Robert Ellis, Principal Investigator and Field Supervisor
Laurel Brown, Fisheries Biologist
Peter Kaczynski, Boat Operator/Boat Electrofisher
Beluse Schonek, Boat Electrofisher Technician

3.0 Sponsor

The LWG is the funding sponsor for the proposed fish collection program. The LWG consists of a group of Potentially Responsible Parties performing a Remedial Investigation and Feasibility Study under U.S. Environmental Protection Agency (EPA) oversight of the Portland Harbor sediments Superfund Site (Section D above for the address and contact person).

4.0 Contractors

The proposed fish collection activities will be conducted by staff of Ellis Ecological Services, Inc. All of the field personnel listed above are employees of Ellis Ecological Services, Inc. Ellis Ecological Services, Inc. will be under a subcontract to Integral, Inc., who is a primary contractor with the LWG. Ellis Ecological Services, Inc. will not subcontract any of the proposed work.

5.0 Disposition of Tissue

No listed fish will be retained.

6.0 Transport and Long-Term Holding of Listed Species-Staff Qualifications

Not Applicable

F. Project Description, Purpose, and Significance

1.0 Justification/Purpose

The purpose of the proposed project is to fill data gaps identified by the EPA for food web model biota tissue needs and for refining uncertainties in contaminants

of interest (COI) tissue concentrations as part of the on-going Remedial Investigation/Feasibility Study (RI/FS) for the Portland Harbor Superfund site. The EPA has requested that the LWG collect samples of the following fish species from specified locations within the designated superfund site:

- smallmouth bass,
- carp,
- black crappie
- sculpin, and
- crayfish.

Discussions on the scope of the collection effort are on-going, but it is known that the sample collection, if it occurs, will be limited to the above-listed species. From our previous experience in collecting these species from the lower Willamette River, we know that boat electrofishing is by far the best method for collecting smallmouth bass and carp. Without the use of a boat electrofisher, it is unlikely that collection of the desired number of smallmouth bass and carp can be achieved. Also, boat electrofishing was successful in collecting a substantial number of sculpin during past collection efforts.

We are not proposing to net or handle any salmonids during the boat electrofishing. However, it is possible that a few salmonids will be stunned by the electrofisher during attempts to collect the other species. Hence, the need for a Section 10 scientific take permit.

2.0 Required by a Federal Agency

In a letter dated June 8, 2007 and addressed to Jim McKenna (Co-Chairman) and Robert Wyatt (Co-Chairman) of the LWG, the EPA Region 10 documented additional data EPA believes are needed to complete the Portland Harbor RI/FS. The letter requested that the LWG collect additional specimens of the above listed fish species from selected locations throughout the superfund site.

3.0 Significance

The proposed fish collection activities are part of the larger Portland Harbor RI/FS that is being conducted to identify appropriate response actions for contamination in the Portland Harbor. In 2000, a 5.7-mile section of the Portland Harbor was designated as a federal superfund site. The RI/FS was initiated in 2001 and various aspects of the study have been continuing since that time. The RI/FS study area has been expanded by EPA to River Mile 2 to 11. Additional background information on the RI/FS can be found on the internet at the following address:
http://yosemite.epa.gov/r10/cleanup.nsf/7780249be8f251538825650f0070bd8b/75e7f27bd108f3eb88256f4a007ba018!OpenDocument.

4.0 Relationship or Similarities to Other Proposed or On-Going Projects

There are no other projects or programs, either on-going or proposed, that can cooperatively provide the proposed fish data needed for the RI/FS.

5.0 Justification for Use of Listed Species

The proposed fish collection work will not target listed anadromous salmonids. However, it is possible that listed anadromous salmonids will be encountered during boat electrofishing for the targeted non-listed species. Consequently, the potential exists for some harrassment, injury or mortality that could constitute "take" as defined under the Endangered Species Act.

G. Project Methodology:

1.0 Project Duration and Scheduling

The proposed project would start August 1, 2007 and would extend through December 31, 2008. Boat electrofishing would be conducted within available in-water work windows. Electrofishing would start in August 2007 and continue until the required quota of smallmouth bass and carp are collected. We presently anticipate that the smallmouth bass and carp can be collected within a 2-month period (i.e. August through September 2007). However, it is possible that the work might have to extend through October 2007. These species of fish move to deeper water when the water cools below about 60 degrees in the autumn. Therefore, if the quota is not reached in 2007, it may be necessary to collect fish in 2008 beginning in August and extending until the required numbers are collected.

Methods

a. Method of Capture

Boat Electrofishing will be used to collect non-listed target species. The boat electrofisher will consist of a 20-ft. jet sled equipped with a Smith-Root 5.0 GPP electrofisher. Any juvenile or adult listed salmonids observed within the electric field of the boat electrofisher will be identified to species (if possible) its length estimated (mm), presence or absence of an adipose fin noted and the data recorded as an observation on a standard data sheet. The condition of each observed listed fish will be noted (e.g., slightly stunned, in tetany or dead) on the data form. All listed fish observed will be left in the river.

b. Schedule

As indicated above, boat electrofishing would begin around the first of August 2007 and continue until the required numbers of smallmouth bass and carp are collected. It is anticipated that this work should be completed by the end of September 2007 but could potentially extend through October 2007. If the required numbers of fish are not collected in 2007 then sampling may be continued in 2008 beginning in August.

Sampling will be conducted in the lower Willamette River (RM 0 to 26.6, see Figure 1). The EPA, in their letter dated June 8 to the LWG, sought collection from the following specific locations in the downstream portion of the lower Willamette River:

- Smallmouth bass - Collect composite samples (five adult fish per composite) independently from each side of the river, within each river mile. Additional samples should be collected in selected contaminant source areas. The selected source areas include yet-to-be-defined areas within RM 6-8 and in the International Slip and Swan Island Lagoon (Figure 1).
- Carp – Composites (five adult fish per composite) should be collected on a river reach basis. Three composites should be collected from each of four river reaches (RM 0.5-3 and Multnomah Channel, RM 3-6, RM 6-9 and RM 9-11.5

c. Description of Any Tags

No listed fish will be tagged.

d. Types and Doses of Any Drugs

No drugs of any type will be used.

e. Temporary Holding Time

No listed fish will be held.

f. Number and Types of Samples Collected from Each Individual

No listed fish will be sampled.

2.0 Possible Alternatives to Proposed Methods

Alternative capture methods for smallmouth bass and carp were considered. Beach seining, backpack electrofishing, angling and set lines were the options considered. Our field crew has previous experience in using all of these

Figure 1
Portland Harbor RI/FS
Round 3B Proposed Electrofishing Area

alternative capture techniques to collect fish from the proposed study area. A few smallmouth bass and carp have been collected by beach seine. However, sites for beach seining in the Portland Harbor are very limited due to riprapped banks, piling and other structures. Also beach seining has a high likelihood of capturing and potentially injuring juvenile listed anadromous salmonids. Backpack electrofishing has not proven to be effective in capturing adult smallmouth bass or adult carp. These fish move out of reach of the backpack electrofisher, which prevents netting. Angling with hook and line has been attempted for collection of smallmouth bass and few have been caught. The time and effort required to obtain the number of fish desired by EPA by angling from all of the sampling locations would be prohibitive and probably unsuccessful. Baited set lines have been used to capture a variety of fish from the lower Willamette River in our past efforts. However few smallmouth bass or carp were collected with this technique.

3.0 Steps Taken to Minimize Adverse Affects of Boat Electrofishing on Listed Salmonids

Electrofishing Precautions and Safety

To minimize the impact of the proposed boat electrofishing on listed salmonid species within the study area the following conservation measures will be taken:

- The boat electrofisher will undergo an annual maintenance check prior to sampling to ensure that all components of the electrofisher are working properly.

- The electrofishing crew(s) will consist of three trained individuals with extensive experience in electrofishing techniques. The leader of each 3-person crew will have a minimum of 100 hours of previous electrofishing experience.

- Field crew training will include the following elements:

    - A review of these guidelines and the manufacturer's equipment recommendations, including basic gear maintenance. Definitions of basic terminology (e.g. galvanotaxis, narcosis, and tetany) and an explanation of how electrofishing attracts fish.

    - A demonstration of the proper use of electrofishing equipment (including and explanation of how gear can injure fish and how to recognize signs of injury) and of the role each crew member performs.

- At the beginning of each sampling day, voltage settings using straight DC current will be gradually increased until the target species can be captured.

If fish capture is unsuccessful with the use of straight DC current then PDC current will be used, preferably at settings ≤30Hz.

- A daily log will be kept that documents the following information:

1. Date
2. River Mile (RM)
3. Latitude and Longitude
4. Pulse Rate
5. Water Temperature
6. Time (military)
7. Conductivity
8 Amperage
9. Output Voltage
10. % of Range
11. Fish response to Anode
12. Distance Fish Attracted

- An umbrella-type anode array with six stainless steel dropper cables on each of two anodes will be used on each boat. These arrays have proven effective in reducing fish damage due to close encounters with the anodes.

- If a juvenile or adult salmonid is observed within the electrofishing field, the electricity will be shut off and the boat will moved to another area before resuming electrofishing.

- Every effort will be made to avoid direct contact of listed fish with the anode. Particular care will be taken if high fish concentrations are encountered. In these situations, the electric current will be turned off to avoid over exposure of stunned fish to the anode.

- Due to the size of the water body to be sampled, it is unlikely that many fish will be exposed to repeated electrofishing. However, if it is found that listed fish are holding in small isolated areas and may be subject to repeated exposure, these areas will be identified and fished at a lower frequency than other sites.

H. Description of Estimates of Take:

Table 1 specifies the anticipated types and numerical estimates of annual take for listed species during the proposed research in 2007. Table 2 provides the same information if sampling is conducted in 2008.

1.0 Recent Status and Trends of ESUs and DPSs to be Taken

The present status and trends of the various ESUs and DPSs included in the take estimates for the proposed work depends, in part, on whether hatchery fish are included in the ESUs and DPSs. In 2005, the NMFS published a final policy on consideration of hatchery-origin fish in Endangered Species Act

Table 1. Anticipated Annual Take for 2007.

ESU/ DSP	Life Stage	Origin	Take Activity	No. of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
UWR Chinook	Juvenile	Natural	Other (Electrofishing for non-listed fish species)	10	1	Lower Willamette River	August through October
UWR Chinook	Juvenile	Listed hatchery fin clipped adipose	Other (Electrofishing for non-listed fish species)	40	2	Lower Willamette River	August through October
UWR Chinook	adult	Natural	Other (Electrofishing for non-listed fish species)	1	1	Lower Willamette River	August through October
UWR Chinook	adult	Listed hatchery fin clipped adipose	Other (Electrofishing for non-listed fish species)	5	1	Lower Willamette River	August through October
UWR Steelhead	juvenile	Natural	Other (Electrofishing for non-listed fish species)	none	none	Lower Willamette River	August through October
UWR Steelhead	adult	Natural	Other (Electrofishing for non-listed fish species)	none	none	Lower Willamette River	August through October
LCR Chinook	juvenile	Natural	Other (Electrofishing for non-listed fish species)	40	2	Lower Willamette River	August through October
LCR Chinook	Adult	Natural	Other (Electrofishing for non-listed fish species)	10	1	Lower Willamette River	August through October

Table 1. Anticipated Annual Take for 2007.

ESU/ DSP	Life Stage	Origin	Take Activity	No. of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
LCR Steelhead	juvenile	Listed hatchery fin clipped adipose	Other (Electrofishing for non-listed fish species)	none	none	Lower Willamette River	August through October
LCR Steelhead	juvenile	Natural	Other (Electrofishing for non-listed fish species)	20	1	Lower Willamette River	August through October
LCR Steelhead	adult	Natural	Other (Electrofishing for non-listed fish species)	none	none	Lower Willamette River	August through October
LCR Steelhead	Adult	Listed hatchery fin clipped adipose	Other (Electrofishing for non-listed fish species)	none	none	Lower Willamette River	August through October
LCR Coho	juvenile	Listed hatchery fin clipped adipose	Other (Electrofishing for non-listed fish species)	20	1	Lower Willamette River	August through October
LCR Coho	juvenile	Natural	Other (Electrofishing for non-listed fish species)	10	1	Lower Willamette River	August through October
LCR Coho	adult	Listed hatchery fin clipped adipose	Other Electrofishing for non-listed fish species	10	1	Lower Willamette River	August through October
LCR Coho	adult	Natural	Other (Electrofishing for non-listed fish species)	5	1	Lower Willamette River	August through October

Table 2. Anticipated Annual Take for 2008.

ESU/ DSP	Life Stage	Origin	Take Activity	No. of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
UWR Chinook	juvenile	Natural	Other (Electrofishing for non-listed fish species)	10	1	Lower Willamette River	August through October
UWR Chinook	juvenile	Listed hatchery fin clipped adipose	Other (Electrofishing for non-listed fish species)	40	2	Lower Willamette River	August through October
UWR Chinook	adult	Natural	Other (Electrofishing for non-listed fish species)	1	1	Lower Willamette River	August through October
UWR Chinook	adult	Listed hatchery fin clipped adipose	Other (Electrofishing for non-listed fish species)	5	1	Lower Willamette River	August through October
UWR Steelhead	juvenile	Natural	Other (Electrofishing for non-listed fish species)	none	none	Lower Willamette River	August through October
UWR Steelhead	adult	Natural	Other (Electrofishing for non-listed fish species)	none	none	Lower Willamette River	August through October
LCR Chinook	juvenile	Natural	Other (Electrofishing for non-listed fish species)	40	2	Lower Willamette River	August through October

Table 2. Anticipated Annual Take for 2008.

ESU/ DSP	Life Stage	Origin	Take Activity	No. of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
LCR Chinook	Adult	Natural	Other (Electrofishing for non-listed fish species)	10	1	Lower Willamette River	August through October
LCR Steelhead	juvenile	Listed hatchery fin clipped adipose	Other (Electrofishing for non-listed fish species)	none	none	Lower Willamette River	August through October
LCR Steelhead	juvenile	Natural	Other (Electrofishing for non-listed fish species)	20	1	Lower Willamette River	August through October
LCR Steelhead	adult	Natural	Other (Electrofishing for non-listed fish species)	none	none	Lower Willamette River	August through October
LCR Steelhead	Adult	Listed hatchery fin clipped adipose	Other (Electrofishing for non-listed fish species)	none	none	Lower Willamette River	August through October
LCR Coho	juvenile	Listed hatchery fin clipped adipose	Other (Electrofishing for non-listed fish species)	20	1	Lower Willamette River	August through October
LCR Coho	juvenile	Natural	Other (Electrofishing for non-listed fish species)	10	1	Lower Willamette River	August through October
LCR Coho	adult	Listed hatchery fin clipped adipose	Other Electrofishing for non-listed fish species	10	1	Lower Willamette River	August through October

Table 2. Anticipated Annual Take for 2008.

ESU/ DSP	Life Stage	Origin	Take Activity	No. of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
LCR Coho	adult	Natural	Other (Electrofishing for non-listed fish species)	5	1	Lower Willamette River	August through October

listing determinations for Pacific salmon and steelhead (50 CFR parts 223 and 224). Hatchery stocks with a level of genetic divergence relative to the local natural population(s) that is no more than what occurs within the ESU: (a) are considered part of the ESU; (b) will be considered in determining whether an ESU should be listed under the ESA; and (c) will be included in any listing of the ESU. For the Willamette River watershed, the following hatcheries were included as parts of the following ESUs and DPSs:

- Upper Willamette River Steelhead – no hatchery component
- Upper Willamette River Chinook – McKenzie River Hatchery, Marion Forks Hatchery, South Santiam Hatchery, Willamette Hatchery and Clackamas Hatchery
- Lower Columbia River Chinook – no hatchery component
- Lower Columbia River Coho – Eagle Creek Hatchery
- Lower Columbia River Steelhead – Clackamas Hatchery

On June 13, 2007, however, Judge John C. Coughenour of the U.S. District Court, Western District of Washington in Seattle, rendered a decision setting aside the NOAA Fisheries Service's 2005 Final Hatchery Listing Policy as contrary to the ESA. Trout Unlimited v. Lohn, Case No. CV 06-0483-JCC, 2007 WL 1795036 (WD Wash June 13, 2007). The Court ordered that until the agency promulgates another policy on consideration of hatchery fish in ESA listing determinations, its 1993 Interim Hatchery Policy will be in effect. The 2005 policy is the subject of litigation in other courts, so it remains to be seen how NOAA Fisheries will ultimately consider hatchery fish in making ESA listing decisions. http://www.nwr.noaa.gov/Salmon-Harvest-Hatcheries/Hatcheries/Hatchery-ESA-Listing-Policy.cfm

If hatchery fish are removed from DPS and ESU determinations, the ruling could affect the present status of some of the populations in the Willamette River watershed by reducing the size of the effective populations. At the present time, NMFS has not changed the status of hatchery fish and it is likely that additional legal clarification will be required before any change is implemented (pers. com. L. Schaefer June 20, 2007).

The following is a brief summary of the present status and trends for the ESUs and DPSs that may be present in the proposed study area.

Lower Columbia River Chinook Salmon

Spawning redd surveys for Lower Columbia River Chinook, which spawn in the lower Clackamas River, rarely have exceeded 100 redds in the last ten years. Most counts have been less than 50. Substantially more naturally spawning fall chinook spawn above Willamette Falls than spawn in the Clackamas River. These fish are not listed because they were introduced above the falls and are not considered native to the area. The Clackamas

River population is very small and numbers of returning adults have been trending downward.

Lower Columbia River Steelhead

Naturally spawning Lower Columbia River winter steelhead spawn largely in the upper Clackamas River. They are counted by PGE biologists at the Faraday Dam trapping facility. Since 2000 adults passing upstream have ranged from less than 500 in 2000 and 2006 to about 2,100 in 2004. Year-to-year variability has increased since the mid 1990s. Between 1984 and 1994 the wild population varied annually between about 700 and 1,800 adults.

Lower Columbia River Coho Salmon

The majority of naturally spawning native Lower Columbia River Coho spawn above the North Fork Dam on the Clackamas River. Numbers of adults passing upstream at PGE's Faraday Dam trap have ranged from about 4,100 in 2001 to about 900 in 2002. In 2006, the adult run was about 2,600. The range in adult returns in the last six years is similar to what has been seen since the mid 1980s. Therefore, no clear trend is apparent. The U.S. Fish and Wildlife Service Hatchery on Eagle Creek (tributary to Clackamas River) releases about 500,000 fin-clipped coho smolts each year.

Upper Willamette River Steelhead

The Upper Willamette River Steelhead DPS is maintained entirely by natural reproduction. Counts at Willamette Falls since 2001 indicate that the 2001 and 2002 years were exceptional, ranging from 13,172 to 15,793 in 2001 and 2002, respectively. Since 2003 the return has been lower reasonably consistent, ranging between 5,362 to 9,472. The 2007 run was 5,494 adults. This population appears to be maintaining itself at a reasonably healthy level.

Upper Willamette River Chinook Salmon

The naturally spawning Upper Willamette River Chinook populations are small and heavily influenced by hatchery fish. The inclusion of hatchery fish in the ESU in 2005 greatly increased the number of fish included in the ESU. It is difficult to predict at this time how the inclusion of hatchery fish affected the naturally spawning populations. Essentially all of the hatchery smolts released in the upper Willamette River are now adipose clipped and released at locations where their presence minimizes contact with native rearing areas. Run sizes over Willamette Falls between 2002 and 2006 have ranged from 143,700 in 2005 to 59,700 in 2006. The majority of the returns were made up of hatchery-origin fish.

2.0 Justification for Potential Mortalities

As indicated in Tables 1 and 2, mortality of listed fish is expected to be very low. By limiting the electrofishing efforts to August, September and October, most of the downstream migration of juvenile fish will be avoided (see Appendix B – Migration Timing for timing of migrations). Our previous experience with boat electrofishing in the lower Willamette River during August, September and October indicated that few juvenile salmonids and very few adults were encountered. Also by using the precautions described above in Section G.4, the potential for killing fish that enter the electrical field will be greatly reduced. Typically it is assumed that mortality associated with boat electrofishing is approximately five percent of the fish stunned by electrofishing. We believe this is a high estimate for the proposed work since we would not be netting or handling any listed fish. As a conservative approach to estimating mortality, we used the five percent mortality assumption in arriving at the estimates of mortality where unintentional take was estimated to be 20 or more individuals of a given population group. In cases where there is a low probability that a listed species/population group would be encountered due to the timing of electrofishing activities, we made the conservative assumption that one fish would be killed within each such population group.

3.0 Details on How Take Estimates Were Derived

The information used in estimating take for each species/population group is presented in Appendix B.

4.0 Presence of U.S. Fish and Wildlife Service Listed Species

No U.S. Fish and Wildlife listed species would be affected by the proposed boat electrofishing activities.

I. Transportation and Holding

Not Applicable

J. Cooperative Breeding Program

Not Applicable

K. Previous or Concurrent Activities Involving Listed Species:

Robert H. Ellis, PhD. Has been the principal investigator on the following Section 10 Permits:

- Permit #1131 for the Port of Portland
- Permit #1320 for Cascade General Corporation

- Permit #1328 for the Lower Willamette Group

Within the past five years there have been no mortality events for listed species on these permits.

L. Certification:

I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand this information is submitted for the purpose of obtaining a permit under the Endangered Species Act of 1973 (ESA) and regulations promulgated thereunder, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or to penalties under the ESA.

Signature

2-5-07
Date

James McKenna, Superfund Project Mgr.
Name and Position Title (print)

Appendix A. Resume for Robert Ellis, Principal Investigator

AREAS OF EXPERTISE

- Aquatic Ecology
- Fisheries Biology

EDUCATION

Pennsylvania State University: Ph.D., Zoology, 1972,
Oregon State University: M.S., Fisheries Science, 1967
Oregon State University: B.S., Fisheries Science, 1965

PROFESSIONAL HISTORY

Ellis Ecological Services, Inc., President, 1992-present.
Beak Consultants Inc., Portland, Oregon, Senior Scientist and Office Manager, 1978-1992.
Oregon Institute of Marine Biology, University of Oregon, Research Associate, 1977-1978
State University College, Brockport, New York, Associate Professor of Biology, 1973-1977
Ichthyological Associates Inc., Pottstown, Pennsylvania, Senior Aquatic Ecologist, 1971-1973

AFFILIATIONS AND SPECIAL TRAINING

American Fisheries Society
American Institute of Fishery Research Biologists
Phi Kappa Phi, Society of
Sigma Xi

REPRESENTATIVE EXPERIENCE

Dr. Ellis has over 30 years of consulting and research experience in fisheries and aquatic ecology. Much of his work has dealt with anadromous salmonids in the Pacific Northwest. He has extensive specialized experience in the assessment of impacts related to port development, urban development, logging, and agriculture on salmon and steelhead trout. In recent years, a considerable amount of his work has dealt with issues associated with federally listed species of anadromous salmonids. Many of Dr. Ellis' projects have required close coordination and effective communication with resource agency personnel. The following are some representative projects in which he has played a significant role:

- Port of Coos Bay, Oregon. Biological Evaluation/Biological Assessment for the Oregon Gateway Marine Terminal on the North Spit of Coos Bay. Managed and participated in the writing, editing and agency consultation associated with preparation of the biological evaluation for fish and estuarine resources and the biological assessment for listed wildlife species.
- Tillamook Bay National Estuary Program. Prepared the Biological Resources Section of the Tillamook Bay State of the Estuary Report. This work was then followed up with three years of fish sampling to develop a long-term fish monitoring program for Tillamook Bay. Annual summary reports as well as an overall report of the findings were prepared. The work was reviewed by a technical peer review committee.
- Vern Scovel. Biological Assessment for Construction of a Marina and Moorage Facility at Bott's Marsh, Nehalem Bay, Oregon. Prepared a detailed biological assessment and joint 404 fill and removal permit application for effects of a new marina and moorage facility on listed salmon and wildlife in the vicinity of Bott's Marsh, Nehalem Bay estuary.
- Hurst Companies of Oregon. Benthic Macroinvertebrate Sampling and Analysis in the Siuslaw Estuary, Oregon. Benthic sampling was done to evaluate effects of severe bank erosion on estuarine benthic organisms. A statistical sampling program was established and intertidal organisms were collected and analyzed. A report was prepared and the information was used to support a zone change that would allow bank protection for the eroding bank.

Basic Wetland Delineation, Wetland Training Institute, 1993
Wetland Delineation Practicum, Wetland Training Institute, 1993
Global Positioning System - Basic, Oregon State University, 1995
IFG 205 Field Techniques for Stream Habitat Analysis, 1982
Open Water Diver, Scuba, Padi Certified, 1972

- Northwest Pipeline Corporation. (under subcontract to Ecology and Environment, Inc.) Biological Assessment for the Clackamas River Gas Pipeline Crossing Abandonment Project. Managed and participated in the preparation of the biological assessment for federally listed fish, wildlife and plants potentially impacted by the pipeline abandonment project.
- Port of Portland (under subcontract to URS). Hayden Island Marine Terminal EIS. Dr Ellis conducted baseline sampling for impact assessment, developed draft Biological Assessments for impacts of a proposed new bridge access to Hayden Island and a new marine terminal, and prepared the fisheries section of the draft EIS.
- Seattle District U.S. Army Corps. of Engineers (under subcontract to URS). Biological Assessment for Remediation of Contaminated Waste Site at Tongue Point, Astoria, Oregon. The UL. S. Army Corps of Engineers is responsible for cleanup of a Department of Defense waste site at Tongue Point, Oregon. EES prepared the fisheries section of a Biological Assessment for impact of the cleanup operation on federally listed anadromous salmonids.
- Port of Portland. Conducted year-round sampling of shallow water habitat in the Portland/Vancouver reach of the Columbia River. Over 40 fish sampling sites were sampled using a statistical sampling design to separate effects of various shoreline habitat conditions. A technical report of the results was prepared for the Port of Portland.
- Lower Willamette Group. Managed and participated in the collection of fish from the lower Willamette River for tissue analysis. This work was part of the ongoing environment risk assessment for the Super Fund Cleanup of the Portland Harbor. Fish were collected from Willamette Falls downstream to RM 2.
- Lower Willamette Group. Designed and managed a radiotelemetry study to determine rates of movement and residence time of sub-yearling Chinook salmon in the Portland Harbor. A draft report of the study findings has been prepared.
- Port of Portland (under subcontract to URS). Portland International Airport Deicing Project. Conducted baseline fish sampling in the Columbia River in the vicinity of the airport. The information developed was

used to evaluate the feasibility of discharging surface water runoff from the airport to the Columbia River.

- Port of Portland. Prepared a Biological Assessment for potential effects of the Alderwood Road Extension and the Portland International Center Employee Parking Lot on listed fish, wildlife and plants in Columbia Slough. The BA was approved by NMFS and USFWS and the projects have been constructed.
- Northwest Pulp and Paper Association. Sampling program to obtain tissue samples from both anadromous and resident Columbia River fish for dioxin analysis. Participated in study design, fish collection, data analysis risk assessment and final report preparation.
- Port of Portland. Prepared Biological Assessments for maintenance dredging at the Port's Marine Terminals 2 and 5. These BAs were prepared on an accelerated schedule to allow dredging to occur during the winter of work window of 2001. The BAs were approved by the regulatory agencies and the work was conducted as scheduled.
- Riverscape LLP. Prepared a joint 404 fill and removal permit application and Biological Assessment for the demolition of the marine wharf at Terminal 1.
- Port of Portland. Prepared a Biological Assessment for maintenance dredging at the Port's Marine Terminal 4, Berths 410 and 411.
- Northwest Pulp and Paper Association. Sampling program to obtain tissue samples from both anadromous and resident Columbia River fish for dioxin analysis. Participated in study design, fish collection, data analysis risk assessment and final report preparation.
- Weyerhaeuser Company (Under subcontract to David Barrows). Biological Assessment for maintenance dredging at Weyerhaeuser's terminal facilities on the Columbia River at Longview Washington.
- Oregon Department of Environmental Quality. Technical reviewer for ecological components of the Willamette River Basin Water Quality Study.
- Oregon State University, Department of Rangeland Resources. Stream habitat analysis to evaluate the long-term effects of a late season grazing management program on a meadow reach of Catherine Creek in northeastern Oregon. Statistical comparisons of selected habitat parameters were made between grazed

plots and plots exclosed from grazing. The data developed are being used to ground truth low-level aerial photography of the site for GIS analysis.

- Washington Forest Protection Association and Washington Department of Natural Resources. Water Use and Land Use Chapters in "The Impact of Environmental and Management Factors on Washington's Wild Anadromous Salmon and Trout".
- Columbia Business Center (under subcontract to Ogden Beeman and Associates) Biological Evaluation. Prepared a Biological Evaluation for effects of maintenance dredging on threatened and endangered salmonid species in the vicinity of two barge slips at the Columbia Business Center, Vancouver, Washington.
- Weyerhaeuser Company's Headquarters Camp Solid Waste Landfill for Pulpmill Wastes. Aquatic Task Leader for the preparation of Fisheries Resources section of the Washington State Environmental Impact Statement and coordinator for the aquatic/wetland mitigation required by the U.S. Army Corps of Engineers 404 permitting process
- City of Klamath Falls, Endangered Sucker Investigations. Project manager for radio-tagging and life history study of shortnose and Lost River suckers in the Upper Klamath River.
- Pacific Gas Transmission Company, Endangered Species Survey. Conducted survey for threatened and endangered aquatic species along the portion of PGT's gas transmission line between northern Idaho and eastern Oregon.
- Hart Crowser, Inc. Prepared the biological section of a detailed interim monitoring plan for a copper mine in the Santiam River basin, Oregon.
- City of Portland Water Bureau, Sandy River Instream Flow Analysis. Supervised the selection of study sites and collection of field data for the instream flow analysis from the confluence of the Bull Run River downstream to Troutdale, Oregon.
- Oregon Forest Industries Council. Supervised electrofishing surveys on over 80 streams in Oregon. The Oregon Department of Fish and Wildlife extensive sampling methodology was used in the collection of fish data on each stream.
- Woodward-Clyde Consultants. Johnson Creek Benthic Macroinvertebrate Survey. Designed sampling

program, conducted field study, and prepared technical report as part of the City of Portland's Johnson Creek Resources Management Plan.

- Beak Consultants Incorporated. Literature review of fisheries and aquatic ecological studies conducted on the Upper Klamath River, Oregon.
- Oregon Department of Economic Development. Prefeasibility Study participant for Mexico Clean Rivers Pilot Project. Conducted site visit to polluted watershed in the State of Veracruz, Mexico, met with Mexican water quality officials and prepared major sections of the prefeasibility report.
- Beak Consultants Incorporated. Conducted quantitative benthic macroinvertebrate sampling at six locations in the Upper Klamath River, Oregon.

PUBLICATIONS, AGENCY REPORTS AND PRESENTATIONS

A list of publications, agency reports and presentations will be provided upon request.

Appendix B – Rationale Used in Estimating Take

SPECIES INFORMATION

Migration Timing

Since boat electrofishing is proposed to occur only during August, September and October, an understanding of migration timing was an important part of the information needed to estimate how many fish of each species/population group would be encountered during the study period. The following is a summary of what is known about the migration timing through the lower Willamette River for each species and life stage.

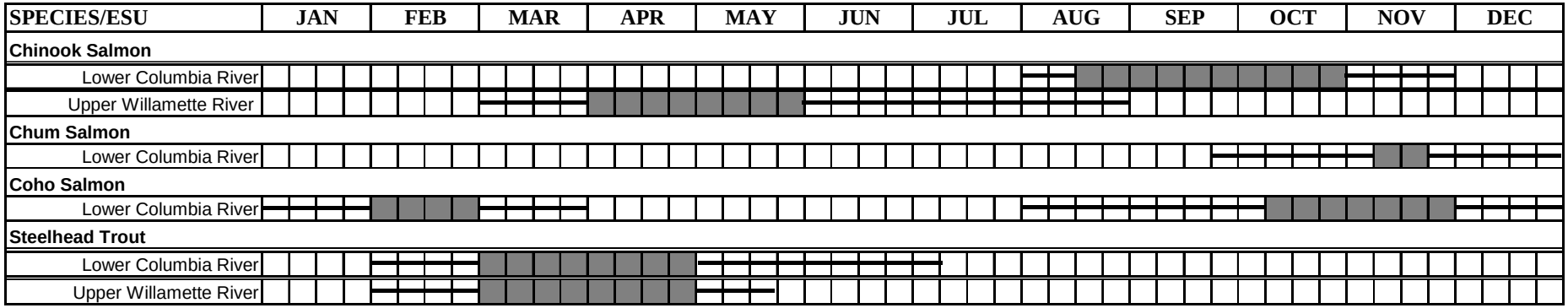
Upper Willamette River Chinook Salmon *(Threatened)*

The upstream migration of adult spring chinook salmon on the Willamette River has been monitored at the Willamette Falls fish passage facilities for many years. Generally the run begins in March, peaks between late April and early June, and is complete by late August (Table B1). The adult run to the Clackamas River follows a similar pattern.

Based on sport fishing catches, it is known that adult spring chinook salmon occur in the Portland Harbor from a few weeks to a few months earlier than they occur at the Willamette Falls fish ladders. It is likely that many adults hold in the water immediately downstream of the falls before ascending the fish ladders. However, it is also possible that some adults hold for periods of time within the Portland Harbor.

The timing of downstream migrating spring chinook smolts was monitored at the Willamette Falls Sullivan Hydroelectric Project bypass facility from 1992 through 1997 by PGE biologists (Domina 1998). Records were kept of the numbers of hatchery (fin clipped) and wild smolts caught at the bypass. Estimates of total numbers of wild and hatchery smolts passing the falls were developed based on the ratio of smolts per unit volume of water diverted at the hydroelectric plant to the total volume of water passing over the falls. Wild spring Chinook smolts typically begin passing the falls in January, peak numbers occur in March or April and by June the spring outmigration is essentially complete (Figure B1). A second out-migration of wild spring chinoook smolts occurs during the autumn, beginning in August and peaking in November (Figure B1). Hatchery smolts peak in late March through April and the migration is usually complete by the end of

Table B1. Timing of adult upstream migration of federally listed salmonids in the lower Willamette River.



Note: thick bars represent peak periods of migration while thin bars represent estimated total period of occurrence.

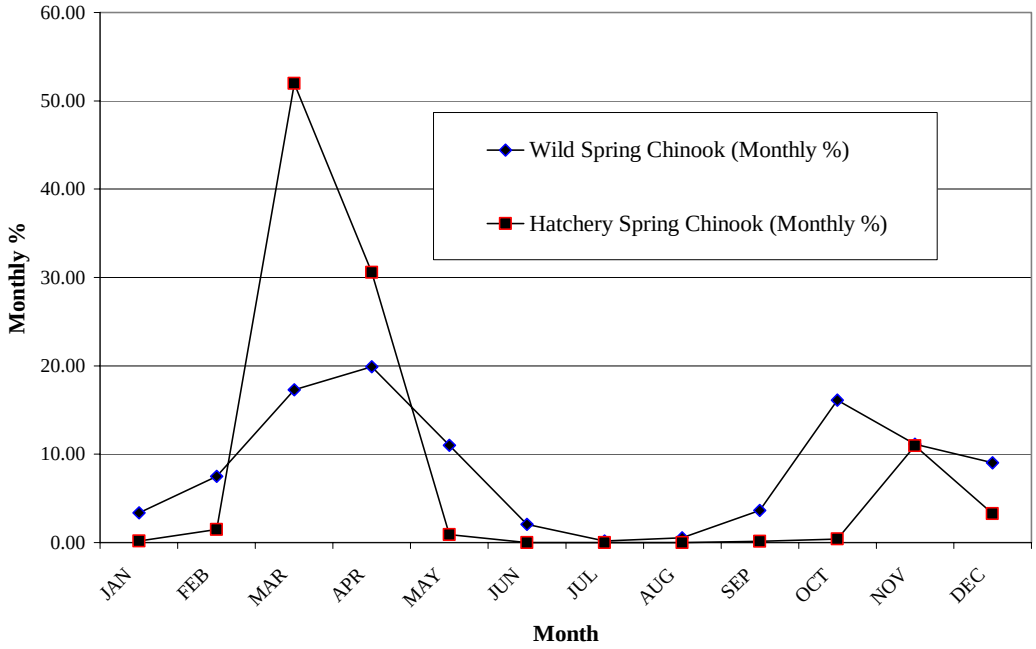


Figure B1. Average downstream migration timing of hatchery and wild spring chinook salmon smolts at Willamette Falls during the interval 1992-1996 (Domina 1998).

May (Figure B1). Hatchery smolts also are released during the autumn, primarily in October and November.

Naturally spawning spring chinook salmon from the Clackamas River and hatchery reared spring chinook at the Clackamas Hatchery are also considered part of this ESU. The number of out-migrating wild, yearling spring chinook smolts has been monitored for a number of years by PGE at the North Fork Dam fish facility. The five-year (1995-99) monthly out-migration averages for the Clackamas River indicate that the wild, yearling chinook out-migration begins in April, peaks in May, and ends in July (Figure B2). A second out-migration of the wild smolts occurs in October and November. on approximately the same schedule as the hatcheries on the upper Willamette River system.

Lower Columbia River Chinook Salmon *(Threatened)*

Both fall-run and spring-run stocks of chinook salmon are included in this ESU. The fall run is predominant. The fall run consists of an early component that return from August through early October and spawn within a few weeks (Kostow 1995) and later components that enter over an extended period of time and spawn from late October through November. The majority of the fall run chinook salmon are called "tules" and are distinguished by their dark skin coloration and advanced state of maturation at the time of freshwater entry. The Clackamas River population consists of these early run "tules". The estimated timing of upstream movement of adult Clackamas River fall chinook through the study area is shown in Table B1.

The majority of fall-run chinook salmon juveniles emigrate to the marine environment as sub-yearlings (Reimers and Loeffel 1967, Meyers et al. 1998). Within the study area, sub-yearling fall chinook salmon originate from either the Clackamas River or the Willamette River upstream of Willamette Falls. Only those from the Clackamas River are listed and belong the Lower Columbia River Chinook ESU. Unfortunately, there are no monitoring stations or dams on the lower Clackamas River that allow estimation of the numbers of juveniles leaving the river.

However, PGE biologists monitored naturally spawning fall chinook salmon out-migration at the Willamette Falls Sullivan Hydroelectric Plant from 1992 through 1997. It is reasonable to assume that the timing of the out-migration of fall chinook on the Clackamas River is similar to the naturally spawning fall chinook in the upper Willamette River.

Prior to 1996, ODFW released large numbers of sub-yearling fall chinook in the upper Willamette River watershed. From review of the monthly counts of sub-yearling fall chinook at the Sullivan Plant bypass, it appears that when hatchery fish were present, the peak of the downstream migration occurred in April. Data for 1996 and 1997 (Figure B3), following cessation of hatchery releases, indicates that the peak of the fall chinook out-migration occurred in late May or early June. Therefore, it appears that the naturally spawned fall chinook emigrate somewhat later than the hatchery fall chinook.

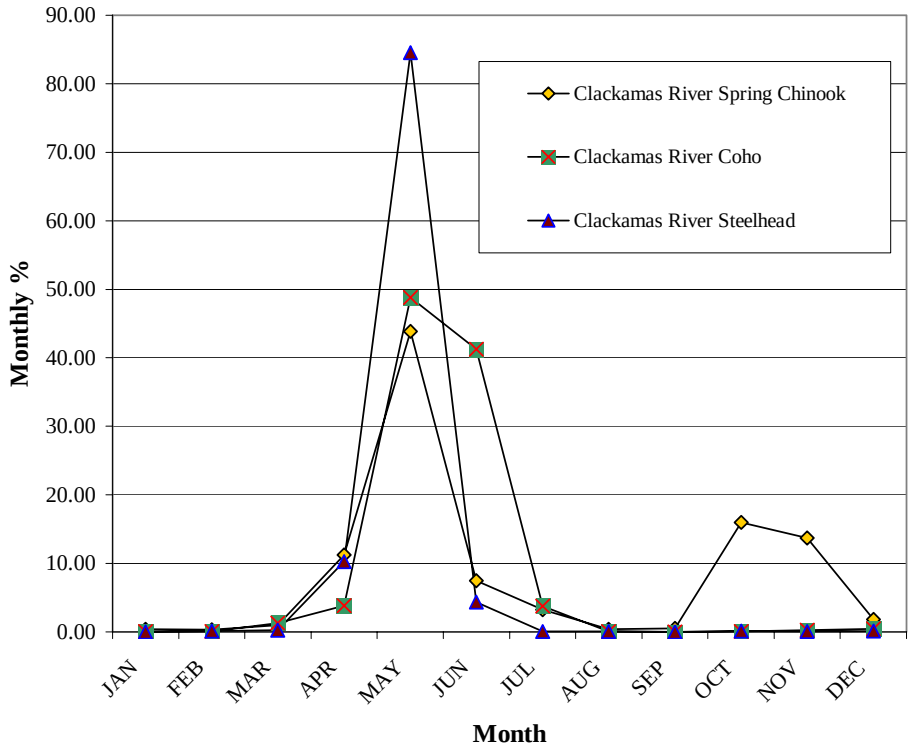


Figure B2. Downstream migration patterns for wild spring chinook salmon, wild steelhead trout, and wild coho salmon smolts moving downstream past the North Fork Dam on the Clackamas River (years 1995-1999) (PGE North Fork Dam Counts).

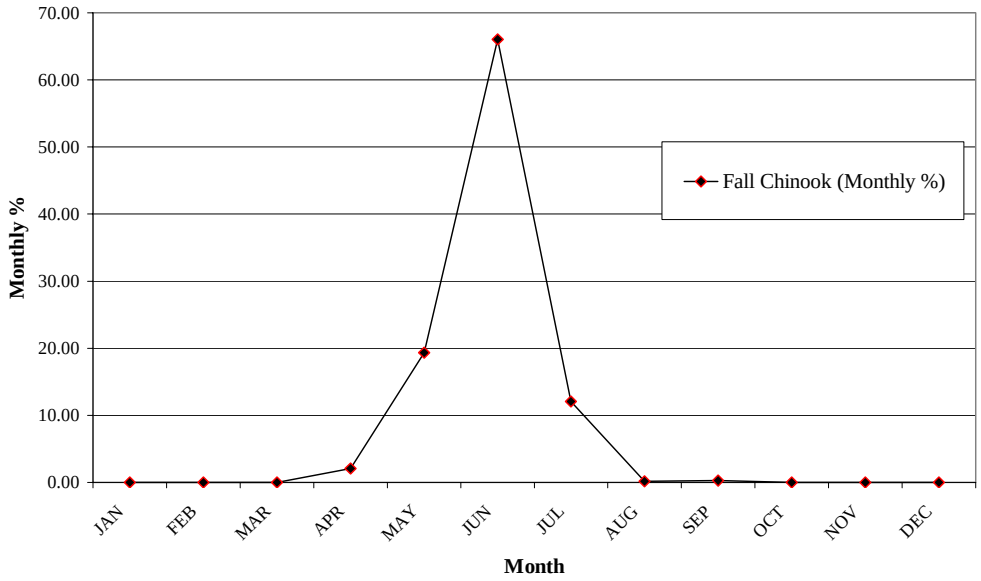


Figure B3. Downstream migration pattern for sub-yearling fall chinook salmon at Willamette falls for the period 1996-1997 (Domina 1998).

We believe the out-migration numbers shown in Figure B3 is probably representative of the present fall chinook out-migration timing for both the Clackamas River and the upper Willamette River although little information is available for the Clackamas River.

Lower Columbia River Steelhead Trout *(Threatened)*

The Clackamas River is the principal spawning and rearing area for members of this ESU that pass through the proposed study area. A few juveniles from this ESU may rear in the lower Willamette River base on the fact that several were captured in 2002 electrofishing work by Ellis Ecological Services, Inc. Only late-run winter steelhead are included in the Clackamas River population. Hatchery late run winter steelhead produced at the Clackamas Hatchery were included in the ESU in 2005. The naturally spawning late run component primarily spawns in the upper Clackamas River watershed (Murtagh et al. 1992).

Adult steelhead are likely to be present in the study area throughout most of the year due to the presence of both summer run and winter run fish. The listed late run winter steelhead that spawn in the Clackamas River typically reach the spawning grounds in March and April. Some of these fish may pass through the study area a few weeks earlier. However, extended pre-spawning residency in down river areas is unlikely because these fish enter freshwater in a mature state and do not typically hold for long periods prior to spawning.

Counts of juvenile steelhead out-migrating from the Clackamas River have been monitored at PGE's North Fork dam fish facility. The five-year (1995-99) monthly out-migration averages for Clackamas River naturally spawned steelhead indicate that out-migration starts in April, peaks in May and is complete by mid July (Figure B2). Steelhead smolts are predominately 2+ years of age and typically move rapidly downstream to the ocean. Therefore, only a short lag time (a few days) between the timing shown for the North Fork counting station (Figure B2) and the passage of these smolts through the study area is anticipated.

Upper Willamette River Steelhead *(Threatened)*

Adults of the late-run Willamette River winter steelhead enter the lower Columbia River in mid-February and March. Spawning usually commences in the tributaries in April and continues through mid-May (Busby et al. 1996). The timing of the adult run has been monitored at the Willamette Falls fish ladder facilities for many years. The run generally begins in March and continues through early May. Kelts would be expected to move downstream shortly after spawning and could be present in the study area through mid June.

Mean monthly counts of hatchery and wild steelhead are shown in Figure B4 for the period 1992-1996. Only the native non-hatchery fish are included in the Upper Willamette River ESU. Steelhead smolt out-migration counts were conducted by PGE at their Sullivan bypass smolt out-migration starts in March, peaks in May, and is essentially complete by mid July (Figure B4).

Lower Columbia River Coho Salmon *(Threatened Species)*

Most adult coho salmon migrate through the lower Willamette River from August through December, with the peak occurring from mid-August through mid-November (ODFW 2003). In addition, there are some late-run native fish that enter the Clackamas River from late December to March (Cramer and Cramer 1994). Thus, adults are expected to migrate through the project action area from August to March, with the majority passing in October and November, and a small peak in February for the late-run Clackamas adults (Table 1).

Juveniles generally spend about one year in fresh water before migrating to the ocean. Juvenile coho salmon migrate through the lower Willamette River throughout their downstream migration, which begins in late March, peaks in April and May, and declines through June (Domina 1997 & 1998, ODFW 2003, 2005). Although coho yearlings are expected to move relatively quickly through the lower Willamette, ODFW studies have found that their median residence time in the lower river was longer (8.7 days) than yearling chinook salmon (3.4 days) or steelhead trout (2.5 days) (ODFW 2005). However, juvenile coho were found to move considerably quicker through the project action area (Ross Island to the mouth (6.2 miles/day)) than between Willamette Falls and

Ross Island (2.7 miles/day) (*ibid*). The project action area for fish species is industrialized and does not provide preferred rearing habitat for juvenile coho salmon.

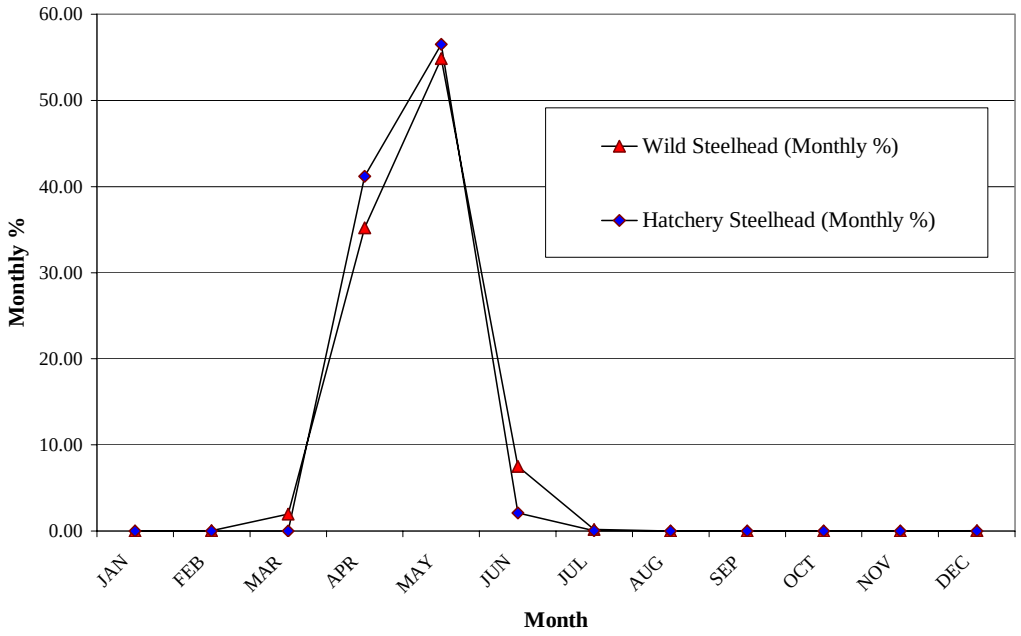


Figure B4. *Average downstream migration pattern of wild and hatchery steelhead smolts at Willamette Falls for the period 1992-1996 (Domina 1998).*

Summary of Migration Timing Analyses

From the above analyses we can conclude that the following listed species/population groups would be present and potentially susceptible to effects of electrofishing during the period August through October.

Upper Willamette River Chinook

- Native juveniles ---increasing numbers from mid August through October
- Fin-clipped hatchery juveniles --- increasing numbers from September through October
- Native adults --- very few, only during early to mid August
- Fin-clipped hatchery adults ---very few only during early to mid August

Lower Columbia River Fall Chinook

- Native juveniles --- very few in early to mid August
- Native adults --- present beginning in mid August through October

Lower Columbia River Steelhead

- Native smolts ---none are expected to be present
- Native juveniles --- a few may rear year round in the lower Willamette River
- Fin-clipped hatchery smolts --- none are expected to be present
- Native adults --- none are expected to be present
- Fin-clipped hatchery adults --- none are expected to be present

Upper Willamette River Steelhead

- Native smolts --- none expected to be present
- Native adults --- none expected to be present

Lower Columbia River Coho

- Native smolts --- if any, would be present in early August
- Fin-clipped hatchery smolts --- none expected to be present
- Native adults --- none expected to be present
- Fin-clipped hatchery adults --- August through October

Take Analysis

In 2002, boat electrofishing was conducted in the Portland Harbor to collect a variety of non-listed fish for tissue analysis for the Round 1 data collection for the Portland Harbor RI/FS. This work was conducted between July 22, 2002 and mid October 2002. The boat electrofishing effort during the August-mid October was about the same that would be expended in the proposed study for the same time period. Records were kept during the 2002 boat electrofishing on the numbers of juvenile and adult salmonids observed or captured, handled and released. Those results are summarized in Table B2 for fish observed or collected between RM 2 and RM 9.

Table B2. Total catch of adult and juvenile salmonids by boat electrofisher for the period August through October 15, 2002.

Species/Population Group	Number Observed and/or Captured &Released
Adults	
Chinook Salmon	3
Steelhead (summer run)	3
Coho Salmon	0
Unidentified Salmonids	2
Smolts/Juveniles	
Spring chinook smolt	1
Fall chinook sub-yearling	5
Steelhead juvenile	3
Unidentified salmonid	1

We anticipate that similar numbers of adults and juveniles will be encountered during the proposed boat electrofishing. Due to the small numbers of fish encountered in 2002, we do not believe that it would be meaningful to calculate detailed ratios for listed native, listed fin-clipped hatchery and non-listed salmonids for each species/population group. With the exception of fall chinook salmon which has a relatively high non-listed component (i.e. those fish that spawn upstream of Willamette Falls), most of the other species/population groups have a high proportion of listed fish. This is largely due to the 2005 ruling that included hatchery fish in the ESUs and DPSs. Therefore, with the exception of fall chinook salmon, we have assumed that any individuals of the other species/population segments observed will be listed fish. Based on historic ratios between estimated numbers of adult fall chinook above the Willamette Falls to those that spawn in the Clackamas River, we have conservatively estimated that the ratio of listed to non-listed fish would be 2 listed to 10 non-listed fish or 20% listed. In 2001, actual counts of fall chinook adults over Willamette Falls and estimates of total spawners in the Clackamas River, based on red count extrapolations, was only 5.3 percent.

When observing fish that have been temporarily stunned by boat electrofishing, it is often difficult to determine the species or whether it is fin clipped or not. We will do our best to make these determinations and record all salmonids affected by the electrofishing field. The expected migration timing for the species/population groups outlined in the above "summary of migration timing analyses" will used to help determine which population group an observed fish belongs in.

For those species/population groups that are likely to be encountered during the proposed boat electrofishing efforts, we have conservatively estimated take based on our previous electrofishing experience in the area. Although no mortalities of listed fish were observed during the previous boat electrofishing, we have assumed that one adult might be killed for each population group.

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